

## **Why Foot Ulcer Wounds Mostly Do Not Heal in Diabetic Patients?**

By Sunderarajan Padmanabhan

New Delhi, April 03: Lifestyle changes, life expectancy and lack of awareness have contributed to a steady rise in metabolic diseases like diabetes in India. The rise in blood sugar levels due to diabetes contributes to the several dysfunctions of retina of the eyes, kidneys and the foot. Diabetic Foot Ulcers (DFU) are a secondary complication of diabetes affecting 15-20% of diabetic population worldwide. The risk factors of development of these ulcers being high blood glucose levels, impaired blood supply to the feet and weakened immune response among diabetic individuals.

In comparison to the western population, DFUs in India show a greater prevalence of bacterial infections and are much severe due to habits of barefoot walking and lack of awareness of foot hygiene in the general diabetic population. Invasion of these wounds by biofilm forming and antibiotic resistant bacteria renders them non-healing which in severe cases leads to amputation and ultimately death of these patients.

Large-scale DNA sequencing based methods have identified the presence of a symbiotic and commensal flora of microbes referred to as the human microbiome, which have been found to play a significant role in a wide variety of health and diseases. Dr. Souvik Mukherjee, NIBMG is interested in understanding the microbiome of diabetic foot ulcers and its impact in wound healing.

Research conducted by his group has highlighted the presence of distinct microbial flora in healing and non-healing wounds impacting the treatment outcomes in a longitudinal study conducted on 80 patients. In healing wounds, the microbial composition is found to shift towards normal skin commensals and in non-healing wounds a shift towards antibiotic resistant pathogenic bacteria. In non-healing ulcers, microscopic colonies of anaerobic bacteria were also identified from wound tissues.

In collaboration with Prof (Dr.) Satinath Mukhopadhyay, IPGME&R and SSKM Hospital and a team of young researchers: Dr. Poulami Mukherjee, MD (DBT-RA), Mr. Qazi Faizul Hasan (Junior Research Fellow) and Mr. Shankha Nath (Research Assistant), research in DFU is focused in developing an assay which can be employed for screening these foot ulcers and predicting their outcomes. Employing large-scale sequencing platforms their research has enabled patient directed treatments against viable but non culturable microbial flora which remains undetected by traditional microbiological culture.

**(Awards: SciGenom Research Grant Award, 2016; Best Poster Award in India-EMBO Symposium on Human Microbiome 2019)**

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